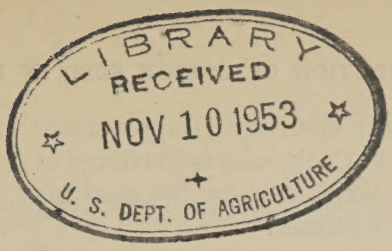

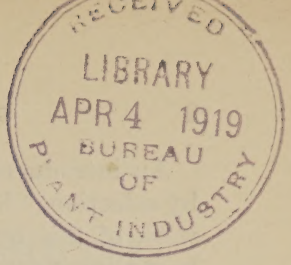

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U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF PLANT INDUSTRY.

New and Rare Seed Distribution,

WASHINGTON, D. C.

DISTRIBUTION OF COTTON SEED IN 1917.

This is the fifteenth distribution of cotton seed conducted by the Office of Seed Distribution in cooperation with the cotton-breeding investigators of the Bureau of Plant Industry.

During the past 13 years, approximately 50 varieties of cotton have been distributed. These have been developed by the experts of the Bureau of Plant Industry or selected by them because of special local value.

The method of distribution followed in the past few years has proved so generally satisfactory that it is proposed to continue it this season. The general distribution of a small quantity of seed (1 quart), to enable the farmer to become acquainted with the characteristics of the variety, will be followed in the most promising sections by a special distribution the following year, which is fully explained under the heading "Report of results of planting." This special distribution furnishes to those who submit favorable reports and sample bolls of the crop grown from the quart package of seed sufficient seed to produce at least one full bale of the new variety of cotton and also to produce a stock of seed for planting a considerable acreage the following season.

The seed of only one new variety is being distributed this year. It is now considered more important to establish a few superior varieties in general cultivation than to add to the number of new varieties. Experience with former distributions shows that supplies of pure seed must be maintained by the Department of Agriculture and repeated distributions made until a new variety has become well established.

70139°—16

An introductory statement on "Improvement of the cotton crop by selection," by O. F. Cook, who is in charge of the cotton-breeding work of this bureau, explains how the seed may be utilized to the best advantage by the farmer.

R. A. OAKLEY,
Agronomist in Charge.

Approved:
WM. A. TAYLOR,
Chief of Bureau.

NOVEMBER 20, 1916.

IMPROVEMENT OF THE COTTON CROP BY SELECTION.

How can the farmer make the best use of a small stock of seed of a superior selected variety? By understanding and applying the methods by which select seed is produced, so as to keep the selected variety from deterioration. The usual way of treating a small quantity of select seed is not at all calculated to enable the farmer to learn the true value of a new variety or to preserve the purity of an improved stock.

TESTING NOT TO BE COMBINED WITH SELECTION.

A mistake made frequently by farmers, and sometimes by professional breeders, is to attempt to combine testing with breeding. The new variety of cotton is planted by the side of the local variety or a mixed stock in order to test its behavior, and seed is saved from the same planting to increase the stock of the new variety. This plan is open to the serious danger that the seed of the new variety when gathered in the fall will not be pure, on account of being contaminated by crossing with the local variety, so that its special value will be lost. The amount of crossing differs with the locality and the season, depending on the abundance of bees or other insects that carry the pollen from one flower to another, but there is usually too much crossing to make it safe to rely on the purity of any stock of seed that has been grown close to another variety of cotton.

ISOLATION OF SEED PLANTS.

A farmer who wishes to make a really adequate test of the value of a new variety should plant the seed in a separate plat, removed at least 300 yards from other fields of cotton or separated therefrom by 25 or 30 rows of corn. An isolated planting does not provide, of course, for a close comparison with the local variety, but this can be made in the following year to much better advantage. With the larger stock of seed then available a field planting can be made, as well as test plantings. In the third year there will be enough seed to stock even a large farm with the new variety, if it has shown itself superior under the local conditions.

Many farmers are unwilling to give the proper care to a new variety until they have made a preliminary test and convinced themselves that it is really superior. It is for this reason that the plan of sending out a smaller quantity of seed in the general distribution has been adopted. Those who use this small sample of seed for testing purposes and plant it in the same field with another variety or

a mixed stock of cotton are advised not to save seed in the fall with any idea that they are keeping a pure stock of the new variety in this way. If the farmer is convinced that the new variety is superior he should get a fresh stock of the seed and plant it in a separate breeding plat, as far away as possible from any other field of cotton.

The distribution of seed of superior varieties of cotton is no longer limited to a single season, as the custom formerly was. Unless improved varieties become established in cultivation in some part of the United States the work of breeding and distribution serves no useful purpose. To increase the number of varieties in a community is not desirable. On the contrary, there would be a distinct advantage if the whole community would grow one variety, if the best variety could be determined. The danger of mixture of varieties by crossing and the mixture of seed at the gin would both be reduced, and the uniformity of the product would enable the community to secure a higher price for its cotton.[1]

WHY SELECTION MUST BE CONTINUED.

Unless selection is continued, the value of a variety is sure to decline. A well-bred variety is superior to ordinary unselected cotton not only in having better plants but in having the plants more nearly alike. Whether selection has any power to make better plants is a question, but there can be no doubt of the power of selection to keep the plants alike. Even in the best and most carefully selected stocks inferior plants will appear, and if these are allowed to multiply and cross with the others the stock is sure to deteriorate. The pollen from the flowers of inferior plants is carried about by bees and other insects and the seeds developed from such pollen transmit the characters of the inferior parent. Even if they do not come into expression in the first generation they are likely to reappear in the second generation.

To grow cotton from unselected seed involves the same kind of losses as in an orchard planted with unselected seedling apple trees. Less cotton is produced and the quality is also inferior. The higher the quality of the cotton the more stringent is the requirement of a uniform staple. Unless the fibers have the same length and strength they can not be spun into fine threads or woven into strong fabrics.

PRESERVATION OF VARIETIES BY SELECTION.

The method of selection to be followed in preserving a variety from deterioration is entirely different from that employed in the development of new varieties. The breeder of new varieties seeks for exceptional individuals and prefers those that are unlike any variety pre-

[1] Some of the numerous advantages to be gained by a better organization of cotton-growing communities have been described in an article published in the Yearbook of the Department of Agriculture for 1911 under the title "Cotton Improvement on a Community Basis."

viously known. If the selection is being carried on to preserve a variety, the object is not to secure seed from the peculiar plants, but to reject all that deviate from the characters of the variety. The first qualification for such selection is a familiarity with the habits of growth and other characters of the variety, to enable the farmer or breeder to confine his selection to the plants that adhere to the "form" or "type" of the variety and to reject all that vary from the type. Most of the latter would prove to be very inferior and at the same time would increase the diversity of the variety and hasten its degeneration.

IMPROVED METHODS OF FIELD SELECTION.

No matter how good a new variety may be or how carefully it may have been bred and selected, inferior plants are likely to appear, especially when it is grown under new and unaccustomed conditions. A special effort is being made to limit the distribution to seed from uniform fields of cotton, but selection is necessary to keep any variety from deterioration, and it is inadvisable to wait until the deterioration becomes serious before beginning the selection. If proper attention be paid to the roguing out of inferior plants in the first season there may be much less variation in the second, the variety becoming better adjusted to the new conditions.

As uniformity is one of the first essentials of value in a variety, the behavior of a new variety in this respect is one of the first things to be noted. Do not wait till the crop matures, but watch the plants in the early part of the season. Even before the time of flowering it is possible to distinguish "freak" plants by differences in their habits of growth or the characters of their stems and leaves. Whenever such variations can be detected, they should be pulled out at once, in order to prevent the crossing of the good plants with inferior pollen. After the bolls begin to reach mature size it is well to go through the plat again and pull out all plants that show by the small size or other peculiarities of the bolls that there had been a variation from the standards of the variety. These preliminary selections greatly simplify the final selection in the fall, when attention can be limited to the yield and to the characters of the lint and seeds.[1]

USE OF PROGENY ROWS IN SELECTION.

Selection can be made still more efficient by the use of progeny rows. The seed of select individual plants is picked separately into paper bags and planted the next season in adjacent rows, in order to test the behavior of the progenies of the different individuals. An inferior progeny can be rejected as a whole and selection limited to

[1] Methods of selection are treated in greater detail in Circular No. 66 of the Bureau of Plant Industry, U. S. Department of Agriculture, entitled "Cotton Selection on the Farm by the Characters of the Stalks, Leaves, and Bolls." See also Bulletin No. 159 of the Bureau of Plant Industry, U. S. Department of Agriculture, entitled "Local Adjustment of Cotton Varieties."

the best rows. It often happens that a very good plant produces a comparatively inferior progeny, which would not be excluded from the stock unless the progeny-row test were made.

Nevertheless the use of progeny rows is no substitute for skill and care in making the selection, for if the selected plants are not all of the true type of the variety, admixture by cross-pollination will occur in the progeny rows the same as in a mixed planting. Protection against the danger of crossing between different progenies can be secured by holding over a part of the seed of the select individuals used to plant the progeny rows. The remainder of the seed that produced the best progeny row can be planted in an isolated breeding plat in the year following the progeny test. In this way a special strain is developed from a single superior plant.

METHODS OF TESTING COTTON VARIETIES.

The best way to test the behavior of two varieties of cotton is to plant them in alternate rows so that they can be compared carefully during the growing season and the yield of each row weighed separately at the end of the season. Of course, it is often possible to judge that one variety is superior to another without weighing, but if the results are nearly equal weighing is necessary. Even experienced cotton men are likely to make errors in guessing at the yields of different rows of the field. A variety that "scatters" its lint may appear to be yielding much more than a storm-proof variety with dense, compact lint that can be shown to be much more productive by comparison of actual weights of seed cotton and percentages of lint.[1] The lint values are also to be compared, especially in long-staple varieties.

ADMIXTURE OF SEED IN GINS.[2]

One of the most serious difficulties in maintaining the uniformity of a superior variety of cotton is the mixture of seed in gins. A few farmers have their own gins or small hand gins for their seed cotton, and in some localities ginning establishments are beginning to provide small gins that are kept clean for ginning seed cotton. Some farmers take care to avoid the mixture of seed by holding their seed cotton until the end of the season, when the time can be taken to clean out the gin. It is also possible to plant progeny rows or seed plats with unginned seed by wetting the lint before planting or by pressing the seed into moist ground.

O. F. Cook,
Bionomist in Charge.

[1] See Circular No. 11 of the Bureau of Plant Industry, entitled "Danger in Judging Cotton Varieties by Lint Percentages," which may be had from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents a copy.

[2] For a complete discussion of the admixture of seed in gins, see Bulletin 288 of the U. S. Department of Agriculture, entitled "Custom Ginning as a Factor in Cotton-Seed Deterioration," which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents a copy.

VARIETIES DISTRIBUTED.

LONE STAR.

The Lone Star variety belongs to the Texas big-boll type and was bred in Texas by Dr. D. A. Saunders, of the Bureau of Plant Industry. It was developed from a single superior plant found in a field of Jackson cotton in the Colorado River bottom near Smithville, Tex., in August, 1905.

In 1908 plats of this selection large enough to give a fair test of yield and lint qualities under field conditions were planted at Waco, Denison, and Cuero, Tex. The yield, percentage, and quality of lint were better than in any other variety with which it was compared, and this superiority has been retained in subsequent seasons.

The following is a technical description of this variety:

Plant of medium height with one to four limbs and many long fruiting branches; main stem very short jointed and less hairy than the majority of big-bolled varieties; the limbs ascending, generally producing fruiting branches at their base; fruiting branches numerous, horizontal or ascending, long, medium short jointed; leaves medium to large, very dark green; petioles very long, somewhat drooping or recurved; bolls very large, round or broadly ovate, 1½ to 1¾ inches in diameter, 1¾ to 2 inches in length, with very short, blunt points, 35 to 45 to the pound; involucral bracts very large, closely appressed, coarse veined, deeply cut into long teeth, the longest teeth often meeting over the end of fully developed green bolls; pedicels of medium length, 1½ inches in length below to three-fourths of an inch at the top of the main stem and the extreme ends of the primary and fruiting branches; the bur thick and heavy, with very blunt points; lint 1 inch to 1⅛ inches in length, very strong, and of uniform length of fiber, 38 to 40 per cent.

In this variety the limbs begin to develop fruiting branches 4 to 7 inches from their bases instead of near their extremities. This appears to be an advantage under weevil conditions, as in years of heavy infestation the bulk of the crop must be obtained from the lower third of the plant. In selection, considerable stress has been laid upon the short-jointed character of the main stem as essential in developing an early-fruiting tendency. The habits of growth are similar to those of the well-known Triumph cotton, and under some conditions the two varieties appear almost indistinguishable; but in other places obvious differences appear, and these are in favor of the Lone Star. The plants are less inclined to become prostrate, the bolls are larger, and the lint longer and more abundant. Very large yields have been reported—more than two bales per acre on measured areas. Under favorable conditions the fiber attains 1⅛

inches in length. Many bales of this cotton have been sold at a premium. The Lone Star is undoubtedly the best variety now available for general planting in the Texas black-land belt and adjacent regions. The variety is being grown extensively in Texas, Oklahoma, and Arkansas.

The seed for this distribution was grown for the Department of Agriculture by Mr. D. M. Crenshaw, Waco, Tex., Mr. G. M. Wacasey, Peniel, Tex., and Mr. B. H. Bailey, Caddo Mills, Tex.

TRICE.

The Trice cotton is an early-maturing short-staple variety developed by Prof. S. M. Bain, of the Tennessee Agricultural Experiment Station, a collaborator of the Bureau of Plant Industry. It is the result of four years' selection from an early variety found on the farm of Mr. Luke Trice, near Henderson, Chester County, Tenn. The original variety is said to have come from southern Missouri and is known locally in Chester County as "Big-Boll Cluster." In the work of selection particular attention was given to earliness, productiveness, form of stalk, and large bolls, the crops being produced on the farm of Mr. W. N. McFadden, in Fayette County, Tenn. A trial made alongside the original variety in 1908 showed a distinct improvement in all the qualities sought in the selection, as well as greater uniformity.

Though developed with special reference to the light, sandy soils of western Tennessee, the variety has given excellent returns in other districts. The most active demand for the seed has come from northern Mississippi, where the invasion of the boll weevil has led to the planting of earlier varieties; but the variety has also proved valuable in other districts not yet invaded by weevils, for it is distinctly superior to King and other varieties prized for extreme earliness. The behavior of plantings of Trice cotton during the past two seasons indicates that the variety is worthy of distribution across the northern rim of the cotton belt and in the Southeastern States.

The Trice cotton is thus described:

> Plant rather small, 2 to 5 feet high, of Peterkin type, rarely with distinct basal branches, very prolific; fruiting branches numerous, short jointed; leaves light green, of medium size, hirsute; bolls medium to large, ovate, often angular, 4 to 5 locked; seed large, with dense whitish or brownish fuzz; lint fine, seven-eighths to 1 inch long; percentage of lint 28 to 33; season early.

This variety having been developed from a cluster type, this character is liable to reappear. The percentage of reversion apparently is greater under more adverse soil conditions. In maintaining the variety, cluster plants should be removed from the field as early as possible.

The seed now distributed was grown by Mr. Frank Lindsay, Portsmouth, Va., and Mr. A. R. Bridger, Bells, Tenn.

COLUMBIA.

The Columbia cotton is an early long-staple variety, well adapted to South Carolina and adjacent States. It was derived from a short-staple variety, the Russell big boll. The first selection was made in 1902 at Columbia, S. C., by Dr. H. J. Webber, formerly in charge of the cotton-breeding work of the Bureau of Plant Industry, and resulted in the finding of a single long-linted plant that gave a superior progeny in 1903. Throughout the process of selection the aim was to select plants having the Russell type of branching and boll, so that the plant of the Columbia is scarcely recognizable as distinct from the Russell variety. The very large boll has also been retained and the variety is in every respect of true Upland type aside from the length of lint and the color of the fuzz.

The Russell variety produces a large seed covered with dark-green fuzz. This character is very undesirable, owing to the discoloration of the lint if ginned while somewhat wet by the pulling off of the green fuzz and also owing to the green color giving undesirable linters. In breeding this variety by selection, therefore, special attention has been given to selecting a white seed. The great majority of the plants of the Columbia variety now produce white seed, but this character has not as yet been entirely fixed and some green seed continues to be produced. There is also a tendency to produce occasional plants with greenish lint. These should be rejected in picking, as the lint is worthless and produces an undesirable discoloration in the bale. The proportion of green seeds is much larger in some seasons than in others, owing to some influence of external conditions not yet understood.

The following is a technical description of this variety:

Plant low, compact, of Russell type, having several long, branching basal limbs, vigorous, prolific; bolls large to very large, ovate, short pointed, opening well, mainly 5 locked; seeds large, fuzzy, white or greenish, 8 to 10 per lock; lint very strong, from $1\frac{1}{4}$ to $1\frac{7}{16}$ inches in length, fine, silky, and very uniform in length; percentage of lint 29 to 33; season early in comparison with the older long-staple varieties.

As a result of continued high prices for long-staple Upland cotton, Columbia cotton is being quite extensively planted in South Carolina and adjacent States.

The Columbia cotton is increasing rapidly in popularity and in some neighborhoods has become the dominant variety. Growers accessible to long-staple markets usually secure a premium of 5 cents or more above corresponding grades of short-staple cotton. Contrary to the general impression that long-staple varieties are unproductive, the Columbia cotton often outyields short-staple varieties grown under the same conditions. The danger now is that failure to keep the seed pure will result in the production of large

quantities of uneven fiber that will injure the reputation of the variety. Hence the importance of continued distribution of select seed. It is also important that communities undertaking to produce long-staple cotton should provide themselves with facilities for maintaining the uniformity of select varieties.

In order to secure a premium, especially for long staple, it is necessary to pick the cotton with care, not only to exclude leaves and other "trash," but to avoid immature and weather-stained bolls. It is also necessary that the cotton be dry before ginning, but not "dead" and harsh. The lint should feel "alive." The grower is also to be warned against allowing long and short cotton to be mixed in the same bale. There is no market for mixed bales.

In some localities it is believed that the Columbia cotton suffers more than the other varieties from the rotting of the bolls through attacks of anthracnose or from other causes. These dangers are increased when conditions favor such a luxuriant development of foliage that the bolls are kept moist by heavy shade. The planting of Columbia cotton in Texas is not advised, though excellent results are reported from some localities in the coast belt. The good qualities of the variety are not retained under the more extreme conditions that are often encountered in the drier regions of the Southwest.

The seed for this distribution was grown by Messrs. C. H. Carpenter, Easley, S. C., and R. C. Keenan, Columbia, S. C.

DURANGO.

The Durango is a new type of Upland long-staple cotton, introduced and acclimatized by the Department of Agriculture. The original stock of seed came from the Mexican State of Durango, but the variety was grown and selected for several years in Texas, chiefly at Del Rio and San Antonio, before being distributed. The results of numerous experiments justify the recommendation of the Durango cotton as an early productive variety adapted to a wide range of conditions in the United States. It has given better results than other long-staple varieties in the irrigated regions of the Southwestern States, as well as in Upland districts of the Southeastern States. In experiments as far north as Norfolk, Va., yields have been secured comparing favorably with King and other early-maturing short-staple varieties. The chief center of production is in the Imperial Valley of California, where the Durango cotton has outyielded the short-staple varieties, as well as producing lint of much higher value.

In earliness the Durango cotton is distinctly superior to the Columbia, which is an advantage in weevil-infested regions or where the season is short. There seems also to be less susceptibility to injuries by anthracnose, perhaps on account of the more open foliage. On account of the erect form of the plants, the Durango cotton is

well suited to the new system of cotton culture which suppresses the vegetative branches and keeps the plants close together. This is of great advantage where the growing season is of short duration.[1]

The lint is of excellent quality and attains a length of $1\frac{1}{4}$ inches under favorable conditions. The bales of Durango cotton thus far produced have been sold at from 2 to 10 cents a pound above the prevailing market prices of short-staple cotton, premiums of 5 or 6 cents being the rule.

The following is a short technical description of this variety:

Plant of upright habit, with a strong central stalk and rather stiff, ascending vegetative branches. Fruiting branches of moderate length or rather short, under some conditions becoming semicluster. Foliage rather deep green, reddening rather early in the season. Leaves of medium size, usually with 5 or 7 rather narrow tapering lobes, leaves with 3 lobes being less frequent than in most other varieties of Upland cotton. Involucral bracts rather small, triangular, cordate, margined with rather short teeth. Calyx lobes rather irregular in length, sometimes very long and slender. Bolls of medium or rather large size; under favorable conditions about 60 to the pound. Shape of bolls, conic oval, with rather smooth surface, the oil glands deeply buried. The proportion of 5-locked bolls varies usually from 40 to 50 per cent. Seeds of medium size, covered with white fuzz and bearing abundant even lint about $1\frac{1}{4}$ inches long under favorable conditions. Lint percentage, 32 to 34.

More complete accounts of the characters and habits of the Durango cotton in comparison with those of other varieties are to be found in several of the publications of the Department of Agriculture.[2]

The seed for this distribution was grown by Mr. Frank Lindsay, of Portsmouth, Va., Mr. C. H. Carpenter, of Easley, S. C., and Mr. R. C. Keenan, of Columbia, S. C.

HOLDON.

Holdon belongs to the Texas big-bolled type of cottons and represents the extreme of the series of big-boll varieties. The lint is longer and the bolls larger and with more of the storm-proof quality than in any other variety. The original plant from which it was developed was selected from the same field as the progenitor of Lone Star. It was found in the Colorado River bottom near Smithville, Tex., in 1905, and the stock has been bred carefully ever since. During the last three years it has been grown on a field basis both at Waco and Clarksville, Tex.

The following is a technical description of the variety:

Plant erect or when heavily fruited decumbent, 2 to 4 feet high, stem with rather irregular joints, vegetative branches or wood limbs 1 to 4, large and prominent, bearing fruiting branches from near the base, fruiting branches numerous, horizontal,

[1] See U. S. Department of Agriculture, Farmers' Bulletin 601, entitled "A New System of Cotton Culture and Its Application," 1914.

[2] See U. S. Department of Agriculture, Bureau of Plant Industry Bulletin No. 220, entitled "Relation of Drought to Weevil Resistance in Cotton," and Farmers' Bulletin 501, entitled "Cotton Improvement under Weevil Conditions."

medium to short jointed. Leaves large, thick and light colored, petioles heavy, longer than the leaves, somewhat drooping, thus giving the plant an open appearance. Flowers large, surrounded by very large, coarsely and deeply toothed bracts, bolls of largest size, 34 to 40 to the pound, mostly 5 locked, ovate, oblong or barrel shaped, with a very abrupt, short, blunt point. Burr thick and heavy, somewhat twisted when open. At the base of each carpel there is a deep and well-marked depression, and on the outside a more or less distinct rounded protuberance or callus. A suggestion of this character is often found in Lone Star and an occasional trace of it in Triumph and other Texas big-bolled cotton, but never so constant or well marked as in this variety. Lint 1⅛ to full 1 3/16 inches, with an extra fine silky finish. Outturn 33⅓ to 35 per cent. Seed medium to large, covered with a dense white fuzz. Holdon has by far the largest percentage of 5-locked bolls of any variety of cotton.

In spite of the disorganization of the cotton market in the fall of 1914 the lint of this variety brought from 9¾ to 10½ cents on the Clarksville (Tex.) market, when Middling short cotton was selling at 6½ to 7½ cents. On account of its thick burr the variety is medium late in opening and is not to be recommended for the northern section of the cotton belt. The stormproof quality is manifested in a high degree, on account of the long abundant lint, which remains very compact and "fluffs out" but little. Picking is not easy until the bolls are well opened.

The seed for this distribution was grown by Mr. W. M. Parks, of Clarksville, Tex., under the supervision of Dr. D. A. Saunders, the originator of the variety.

DIXIE, A WILT-RESISTANT VARIETY.[1]

The Dixie wilt-resistant cotton had its origin in a resistant individual selection made at Troy, Ala., in 1902. The plant was presumably an accidental hybrid between two of the numerous varieties of Upland cotton being grown there on wilt-infected land. This line of work was begun by Mr. W. A. Orton with the object of producing a strain of cotton that could be successfully grown on lands that were infected with the wilt or "black-root" disease. From this original selection a uniform strain was developed which proved highly resistant to wilt and which was subsequently named "Dixie." During the succeeding years of its development the variety has been bred by the most careful methods of individual selection and progeny-row tests, always being planted on wilt-infected land so that non-resistant plants would be eliminated as they appeared and only the most resistant retained. As a result, the variety has been considerably improved in uniformity, wilt resistance, earliness, size of boll, and length of lint.

Through the planting of the wilt-resistant Dixie cotton, combined with the use of the root-knot rotations outlined below, the wilt or black-root disease is being successfully controlled. The variety has

[1] See U. S. Department of Agriculture, Farmers' Bulletin 625, entitled "Cotton Wilt and Root-Knot," 1914.

now been grown on a large scale throughout the wilt-infected sections of South Carolina, Georgia, Alabama, and other States for several years and has proved well adapted for use on land where other varieties suffer severe loss from wilt. Crops of a bale or more per acre have been grown in numerous localities on such wilt-infected land. Farmers owning hundreds of acres of land on which wilt reduced the crop 50 to 75 per cent with ordinary varieties have stated that the use of Dixie cotton has saved them from financial ruin.

The following is a technical description of the variety:

Plant vigorous, wilt resistant, of medium height, pyramidal, nearly of the Peterkin type, usually with two or more large basal branches and with long, slender, slightly drooping fruit limbs; leaves of medium size; bolls of medium size, about 75 being required for 1 pound of seed cotton, easy to pick, but very storm proof; seed small, weight of 100 seeds 10 grams, variable in color, but typically covered with greenish brown fuzz; lint about seven-eighths of an inch; percentage of lint to seed 34 to 35.

Root-knot is very generally associated with the wilt disease and is by many farmers confused with it. The two diseases are distinct and require different methods of treatment. Wilt is caused by the attacks of the fungus *Fusarium vasinfectum*, which penetrates, grows in, and plugs the water-carrying vessels of the plants, thus preventing the rise of water. This disease attacks only cotton and okra. Root-knot is caused by nematodes, or eelworms, microscopic in size, which bore into the roots and cause knots or swellings on them. These nematode-infested areas of the root are thereby weakened and furnish points of entrance for the wilt fungus. Root-knot is known to attack many farm crops besides cotton, notably cowpeas, tomatoes, cucumbers, and cantaloupes. The damage resulting from the two diseases occurring together is much greater than from either alone.

Different methods of treatment are necessary for the control of the troubles. Wilt can be successfully controlled by planting a wilt-resistant variety of cotton in connection with the usual crop rotations practiced by the best farmers. When root-knot occurs on land already infected with the wilt disease, no cotton should be planted on it until the diseased field has been rotated one, two, or three years, according to the severity of the disease, with crops immune to the trouble. The best rotations for such root-knot infected land include corn, barley, oats, wheat, rye, Iron or Brabham cowpeas (these are the only commerical varieties known to be resistant to root-knot), velvet beans, peanuts, and beggarweed. The individual farmer can make up from this list of crops the rotations best suited to his locality and system of farming. The object in view is to starve out the nematodes by planting crops on which they can not live. After the root-knot has been thus reduced by rotation, the Dixie wilt-resistant variety of cotton should be planted on land which also has the wilt.

The seed for this distribution was grown by Mr. J. C. C. Brunson, Florence, S. C., under the supervision of Mr. L. O. Watson, who has arranged the distribution of Dixie cotton seed for the season of 1917.

ACALA.

This variety, like Durango, has been developed from imported seed and represents a new form of Upland cotton previously unknown in the United States. The original stock was obtained by Messrs. G. N. Collins and C. B. Doyle, of the Department of Agriculture, at Acala, in the State of Chiapas, in southern Mexico, in December, 1906, as the result of an expedition sent out for this purpose, the existence of a native big-boll type of cotton in southern Mexico having been discovered during a previous expedition conducted by Mr. O. F. Cook.

The preliminary work of acclimatizing and selecting desirable strains from the Acala stock was carried on chiefly in southern Texas in the years between 1907 and 1911. In 1911 the variety was planted for the first time on a field basis at Waco, Tex. During the last six years it has given very satisfactory results in several localities in Texas, Oklahoma, and western Tennessee. It has attracted very favorable attention in Oklahoma as a large-bolled cotton earlier than Lone Star or Triumph, producing a similar abundance of lint with a somewhat longer staple.

The present strain, adapted to northern conditions, is from a selection of 20 plants made by Dr. D. A. Saunders from the original field grown at Waco in 1911. These selections were planted in progeny rows the following year in an isolated block at Waco, and all but three of the progenies discarded that fall. The three progenies were increased in 1913, and in 1914 a part of the increase was planted at Okema, Okla., and a part at Clarksville, Tex.

The variety may be described technically as follows:

Plant of medium height, with strong, erect main stem. Wood limbs or primary branches few, erect or ascending. Fruiting branches short jointed, zigzag, the lower branches long, becoming very short above, giving the plant a semicluster appearance. Leaves of medium size, dark green, those of the main stock usually with five lobes, on the fruiting branches three lobes; the lobes long and very sharp pointed, resembling those of the Durango. Bolls medium size—1½ inches or longer—ovate or ovate-oblong with a rather short blunt point; 50 to 60 to the pound. Involucral bracts rather small for an American variety, rarely reaching more than half the length of the mature bolls; teeth long and narrow and somewhat scythe-shaped, often interlacing over the buds. Pedicels of medium length—1½ inches—burrs often pendent, of medium thickness, stormproof, opening wide. Lint $1\frac{1}{16}$ to $1\frac{3}{16}$ inches, usually $1\frac{1}{8}$ full, with good drag and extra strong; clear white without creamy tint. Percentage of lint, 32 to 35.

In the shape of the plant, the type of boll, and especially in the quality of the lint, Acala is distinct from all other varieties and is

one of the most striking sorts thus far introduced. It has more resemblance to Durango than any other variety, and may be said to be intermediate between Durango and the Texas big-boll type of cotton in foliage and habits of growth as well as in the characters of the fiber. It meets a distinct agricultural need in maturing somewhat earlier than Lone Star or other big-boll cottons. On this account it promises to be rapidly extended in cultivation in parts of northern Texas and Oklahoma. It is already well known in some communities, and local cooperators and breeders are finding a ready sale for the seed, sometimes calling it "Kelly." Its earliness in these sections makes it especially adapted to the bottom lands, where cotton tends to grow rank and be late in maturing, and on the more northern highlands where frost shortens the growing season. It is particularly noted also for the good drag and the extra strength of its fiber. In the long-staple market Acala brings a premium of $7.50 to $12 a bale.

The seed for this distribution was obtained from Barrow Bros., Quinlan, Tex., Mr. Joe Clanton, Greenville, Tex., and Mr. A. B. Fowler, Clarksville, Tex.

REPORT OF RESULTS OF PLANTING.

Inclosed with the quart package of cotton seed sent for the preliminary trial will be found a yellow return card showing the variety of the seed sent, which is to be returned to the Department of Agriculture in case the grower is willing to cooperate in testing the comparative value of this variety in various cotton-growing regions. To those returning this yellow card, a blank form will be sent in the fall of 1917 for use in giving a detailed report of the results obtained, including the following items:

(1) Character of the soil.
(2) Character of the season.
(3) Whether the seed of the new variety was isolated or planted with a local variety for comparison.
(4) Name of local variety used for comparison.
(5) Size and yield of row or plat of the new variety.
(6) Yield of equal row or plat of the local variety.
(7) Rating of the new variety for your section—whether excellent, good, fair, or poor.
(8) A sample of seed cotton representing ten 5-locked bolls, the seed cotton from each boll to be picked carefully and wrapped separately in a small piece of paper.

Should the report of the preliminary test prove to the Department of Agriculture that the variety is desirable for the grower's conditions and if a 10-boll sample of the seed cotton is submitted in accordance with instructions, he will be permitted to share in the special distribution of half-bushel lots of seed of the same variety the following season.

In order to take advantage of this special distribution it will be necessary for the grower to keep careful notes of the behavior of the plants grown from the quart package of seed, so that a complete report can be made on the blank which will be sent for that purpose.

The sample bolls are to be used for determining the length, quality, and percentage of lint. This information, together with the detailed report, will enable the cotton experts of the Department to decide whether the variety is promising under the grower's conditions and will aid in assigning the distribution of the larger lots of seed to such communities only as are likely to adopt the new varieties and establish them in regular cultivation.

The samples should be accompanied by the name and address of the grower, as well as the name of the variety grown. In previous years it has been necessary to discard many samples because they were not marked and there was no way to identify them.

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